

Application No. 10/665,100
Amendment dated November 22, 2005
Reply to Office Action of August 24, 2005

Docket No. 1232-5157

Amendments to the Claims:

Claims 24-37 are pending in this application. Claims 24 and 31 are independent. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-23 (CANCELLED):

24 (CURRENTLY AMENDED): A position determination method of determining positions of a plurality of regions on an object, said method comprising:

a detection step of detecting an image of a mark on each of sample regions selected from the plurality of regions on the object to generate image data, while each of the sample regions is positioned so that the image of the mark is detected;

a processing step of processing the image data, with respect to each of the sample regions, with each of a plurality of signal processing methods, ~~with respect to each of positions of the marks,~~ to obtain a position of a region of the mark in the image data with respect to each of the plurality of signal processing methods;

an obtaining step of obtaining an expression approximately representing the positions of the plurality of regions based on positions obtained in said processing step with respect to each ~~set of the obtained positions, each of the obtained positions being obtained with one of the plurality of signal processing methods in said processing step~~ of a plurality of combinations of the sample regions and the signal processing methods;

an evaluation step of evaluating approximation degrees of the expressions obtained in said obtaining step; and

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a selection step of selecting ~~one of the plurality of signal processing methods with respect to each of positions of the marks~~ a combination fo the sample regions and the signal processing methods based on evaluation results obtained in said evaluation step.

25 (CURRENTLY AMENDED): A method according to claim 24, wherein said evaluation step ~~includes~~ comprises calculating difference between a position of the mark, obtained based on positions obtained in said signal processing step, used for obtaining the expression and a position of the mark obtained by the expression.

26 (PREVIOUSLY PRESENTED): A method according to claim 24, wherein the plurality of signal processing methods are a plurality of template matching methods of which templates are different from each other.

27 (PREVIOUSLY PRESENTED): A method according to claim 24, wherein the plurality of signal processing methods are a plurality of template matching methods of which window widths to be set on the image data are different from each other.

28 (CURRENTLY AMENDED): A method according to claim 24, wherein the plurality of signal processing methods calculate a plurality of ~~local maximum~~ extremal slope positions in the image data of which kinds of the extremal slope are different from each other, respectively.

29 (CURRENTLY AMENDED): A method according to claim 24, wherein said selection step selects one of the plurality of signal processing methods with respect to each of the ~~plurality~~ of sample regions.

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30 (PREVIOUSLY PRESENTED): A method according to claim 24, wherein said selection step selects one of the plurality of signal processing methods with respect to each of the marks.

31 (CURRENTLY AMENDED): A position determination apparatus for determining positions of a plurality of regions on an object, said apparatus comprising:

a detection system ~~which detects~~ configured to detect an image of a mark on each of sample regions selected from the plurality of regions on the object to generate image data;

a storage configured to hold the object and to position each of the sample regions for said detection system to detect the image of the mark;

a first processing unit configured to process the image data, with respect to each of the sample regions, with each of a plurality of signal processing methods, ~~with respect to each of positions of the marks~~, to obtain a position to of a region of the mark in the image data with respect to each of the plurality of signal processing methods; and

a second processing unit configured to obtain an expression approximately representing the positions of the plurality of regions based on positions obtained by said first processing unit with respect to each ~~set of the obtained positions, each of the obtained positions being obtained with one of the plurality of~~ of a plurality of combinations of the sample regions and the signal processing methods, to evaluate approximation degrees of the expressions, and to select ~~one of the plurality of signal processing methods with respect to each of positions of the marks~~ a combination of the sample regions and the signal processing methods based on the evaluation results.

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32 (CURRENTLY AMENDED): An apparatus according to claim 31, wherein said second processing unit ~~evaluates~~ is configured to evaluate the approximation degree by calculating difference between a position of the mark, obtained based on positions obtained by said first processing unit, used for obtaining the expression and a position of the mark obtained by the expression.

33 (PREVIOUSLY PRESENTED): An apparatus according to claim 31, wherein the plurality of signal processing methods are template matching methods of which templates are different from each other.

34 (PREVIOUSLY PRESENTED): An apparatus according to claim 31, wherein the plurality of signal processing methods are template matching methods of which window widths to be set on the image data are different from each other.

35 (CURRENTLY AMENDED): An apparatus according to claim 31, wherein the plurality of signal processing methods calculate a plurality of ~~local maximum~~ extremal slope positions in the image data of which kinds of the extremal slope are different from each other, respectively.

36 (CURRENTLY AMENDED): An exposure apparatus for exposing a plurality of regions on an object to a pattern, said apparatus comprising:

a position determination apparatus, ~~for determining positions of the plurality of regions on the object, as defined in claim 31~~ as defined in claim 31 for determining positions of the plurality of regions on the object.

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37 (PREVIOUSLY PRESENTED): A method of manufacturing a device, said method comprising steps of:

exposing a plurality of regions on an object to a pattern using an exposure apparatus as defined in claim 36;

developing the exposed object; and

processing the developed object to manufacture the device.